purchaser has the option of taking a certain number of thousands at the same rate. As soon as the purchase money has been paid, the oysters are handed over to the purchaser, who sends them off by train, or deposits them in the *kottoo* at the northern end of the camp, where various natural agents bring about the requisite process of dissolution of the animal matter. After some days the residue is carefully washed, the prevailing maggots skimmed off, and a careful search made for the pearls.

Pearl Camp. EDGAR THURSTON.

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## *CALIFORNIAN FORESTRY.*

IT is matter for great satisfaction to learn that the "people of the State of California represented in Senate and Assembly" have created a Board of Forestry for the purpose of collecting and diffusing information with regard to forestry, tree-culture, and tree-preservation. The readers of NATURE will not fail to appreciate the economic significance of wisely administered forest laws so far as those laws are based upon scientific knowledge, and there are special reasons why they should feel an interest in the forests of the Pacific slope. They will consequently be glad to learn from the second biennial Report of the State Board of Forestry now before us that whereas, "under the old conditions, waste, destruction, and violation of law were rife, . . . the activity of the Board in attempting a reform, and the consequent investigations of the Government, have had a most gratifying result." Fires have been reduced in frequency and extent, watersheds and springs have been protected, slopes saved from further denudation, and replanting effected. It seems strange that, with so great a wealth of native trees, replanting should have become necessary, and still more that the Eucalypts of Australia should be preferred for this purpose to the pines of the Sierras. Nevertheless there are many sites where drought-resisting trees are specially required, and in which some of the Eucalypts, such as *viminalis* and *corynocalyx*, do better than the pines. Experimental stations have been established under different conditions of soil and climate, survey-maps have been constructed, while in the Report now before us a beginning has been made of a scientific and popular description of the forest trees of California. The preparation of this catalogue has been intrusted to Mr. J. G. Lemmon; its illustration will be undertaken by Mrs. Lemmon, and by photographs. For botanical purposes the writings of Engelmann, Sargent, Watson, Parry, and others in recent times, of Sir W. Hooker and Dr. Arnott at a more remote period, will supply what is needed.

Mr. Lemmon waxes enthusiastic, as well he may, over the forests of California. Pre-eminent over all forestal regions of the earth are the dense and extensive tree-growths clothing the slopes of that most diversified and wonderful of mountain-ranges—the Sierra Nevada of Western America—a range distinguished by the abruptness of its majestic uprise from the plain, the splintered and rough-hewn forms of its thousand peaks, the high elevation of their pinnacles ever bearing their crowns of snow, but most of all pre-eminent for its bounteous and beautiful "enrobing forest, . . . the noblest in North America, perforated along its raised centre-line by a thousand peaks rising through the mantle into perpetual winter; while both slopes, east and west, are rent by a million valleys, depressed through the robe (of forest) into the middle region of changing seasons, and the fringe of the garment trails out over the domain of almost perpertual summer." In a similar strain Mr. Lemmon proceeds at considerable length and in a style we are not accustomed to meet with in "Blue-books." The Sierra forests, so far as environment is concerned, occupy a middle position between torrid and frigid conditions. They are composed mainly of evergreen trees, not one of which is specifically identical with the trees on the Atlantic side of the Continent, though often so curiously alike that each genus has its "representative species" on either side. The "big trees," *Sequoia gigantea*, or *Wellingtonia*, have been written about so often that most people are familiar with them. "Far excelling them in loveliness" are the four species of *Abies*—*nobilis, grandis, magnifica*, and *concolor*. These are all, with many others, cultivated in our parks and gardens, where they thrive better as a rule than in the Eastern States of America. Already they justify in a measure Mr. Lemmon's ecstasies; though it is probable that their beauty will not be enhanced as they grow old, for many of these trees which are pictures of grace and beauty when young become "scraggy" and unlovely when old. Fortunately the standard of age is different in trees and men, and some generations of men may pass before the trees lose their charm. Of their value as timber trees in this country we need not speak here; indeed, little definite is yet known; but, at any rate, there are well-founded hopes in the case of the Douglas fir, the Nootka Sound cypress, *Thuya borealis*, the *Thuja gigantea*, and some others which seem destined to play an important part in the forestry of the future.

After some generalities Mr. Lemmon proceeds to give a classification of the true pines (*Pinus*), of the Pacific slope, a classification intended for popular purposes, and therefore one in which the histological characters of the leaves are passed over. The main divisions are into smooth-coned pines and rough-coned pines, corresponding to the sections *Strobus* and *Pinaster* respectively. In the one the scales of the cone end in thick, prominent, often spiny bosses, in the other the ends of the scale are nearly flat or project but little. Then comes a subdivision according to the length of the cone, surely a most untrustworthy criterion; for instance, Lambert's pine, the gigantic sugar pine, bears cones varying from 10 to 22 inches in length according to Mr. Lemmon's own showing. Further subdivisions are founded on the position of the young cone near the terminal leaf-bud or at some distance from it, on the length of time the cones remain on the tree, the way in which the scales eventually separate, and so forth. Having characterized the various species of *Pinus*, the author proceeds to give detailed information about each. This is the most valuable portion of Mr. Lemmon's report for European botanists. We would fain make many quotations, but our space allows us only to mention two species. The magnificent sugar-pine (*Lambertiana*), was first made known by Douglas. It sends up a magnificent shaft two hundred feet high, and sometimes much more. The value of this tree for "lumber" purposes is as great as its stateliness is imposing, hence thousands of noble trees have been shamefully destroyed. "Lawless vagabonds penetrate the Sierra forests with only the equipment of an axe and a long saw, and, levelling these monstrous trees, they saw out a cut, examine it, and perchance move on to the destruction of others, leaving to rot on the ground trees that would yield to the careful lumberman twenty thousand to fifty thousand feet of clear lumber, worth hundreds of dollars." *Pinus Torreyana*, the lone pine, also deserves special notice here as a species of much structural interest, and as one which, it appears, is on the high road to extinction, unless that process can be obviated by forest ordinances or by the care of the cultivator. On the coast of Southern California, on the bluffs at Del Mar, San Diego County, within a range of four miles only, and nowhere else so far as known, are a few small trees, buffeted and often prostrated by ocean winds, clinging to the face of crumbling yellow sandstone. On the sheltered inner side of the hills and on the spurs of the cañons, bathed with frequent sea-fog, the trees have indeed a better chance, and they accordingly there form a trunk some thirty or even fifty feet in height,

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capped with a spreading crown. The leaves are in fives, as in many of the Mexican pines, and the cones have thick scales, each terminated by a short strong prickle. "In many respects this species of pine stands alone among Californian Conifers. No other species is found within fifty miles of it; none other survives such buffetings by the sea winds, and no other bears such large flowers, hard nuts, and such strong leaves. . . . In the few localities young trees of all ages are found, but always less in number than the older trees, from which it is inferred that the species is slowly succumbing to its environment, and must if not protected soon become extinct." Such a tree, apart from its interesting structure and history, would be a valuable introduction as a sea-coast pine, wherever the climatal conditions are otherwise favourable.

The Report from which we have taken these particulars is illustrated by photographs, which, if not in all cases very clear, at least show fairly well the general habit of the trees. For details of structure they are not so well suited, and we trust that in future Reports some other means may be taken to give adequate representation of such details. We look forward with eagerness to the continuation of the history of the Californian trees, the silver firs, the Douglas firs, and others that yield in no respect to the pines.

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## *THE EXTINCT STARLING OF RÉUNION* (FREGILUPUS VARIUS).

TIME alone can prove whether we are right in calling the *Fregilupus* an extinct species, for many people have imagined that the bird still exists in the interior forests of the Island of Réunion; but as year after year passes by and no specimens are discovered, we fear that we must class the starling of Réunion, along with the Dodo and other birds of the Mascarene Islands, as having been exterminated by the hand of man.

The earliest mention of the *Fregilupus* is believed to be that of Flacourt, who, in an account of a voyage to Madagascar, speaks of a bird called the "Tivouch," found in Madagascar, Bourbon, and the Cape, and described as being "black and grey, with a fine crest." The species was for a long time supposed to inhabit the Cape, and Montbeillard calls it the "Huppe noire et blanche du Cap de Bonne Espérance." Its crested head and curved bill were evidently the cause of the bird being called a Hoopoe, as was done by most of the older writers, until Levaillant in 1806 put it down as a *Merops* or Bee-eater. The latter author knew of eight specimens at least, two in the Paris Museum, one in the possession of each of the following persons, MM. Gigot Dorey, Mauduit, l'Abbé Aubry, M. Poissonier, one in the collection of M. Raye, at Amsterdam, and one in Levaillant's own collection. The fate of most of these specimens is unknown at the present day; they have doubtless decayed or been destroyed, as the mode of preservation of animals at the beginning of the century was by no means perfect.

In 1833 a very fine specimen was sent by Mr. Nivoy to the Paris Museum, where we saw it a few days ago, along with a more ancient individual, doubtless one of the two known to Levaillant. The same Museum also possesses two specimens in spirit. The only representative of the genus *Fregilupus* in this country has hitherto been a skeleton in Prof. Newton's possession. This individual was shot in 1833 by the late Jules Verreaux, who gave it to Prof. Newton. We are happy to announce, however, that the Trustees of the British Museum have recently acquired a very fine example of this extinct starling, one too which, curiously enough, was not known to Dr. Hartlaub when he gave in 1877 the list of specimens supposed to exist in Museums. The bird now in the Natural History Museum has been acquired from the well-known Riocour collection at Vitry-la-Ville. This famous collection, the work of three generations of the Counts De Riocour, consisted of a series of excellently mounted specimens, forming a choice little Museum which it would be hard to excel. The grandfather of the present Count was the founder of the collection, and was an intimate friend of Vieillot and the old French naturalists at the beginning of the century. Nearly all the specimens of that age are named by Vieillot, several of whose types are in the Riocour collection; and Dr. Günther has been successful in securing these also for the cabinets of the British Museum. A more interesting link with the past than this collection of the Counts De Riocour can scarcely be imagined, and we are glad to know that in the hands of Mr. Boucard, who is now the owner of the collection, it will receive the kindly consideration which such a famous Museum deserves.

Writing in 1877, Dr. Hartlaub, in his "Vögel von Madagascar's," gives a list of the specimens of *Fregilupus* known to him, as follows:—Four in the Paris Museum (two stuffed and two in spirits); one in the Caen Museum; one at Leyden (old and bad); one in the Stockholm Museum; one in the Museum at Florence; one in the Pisa Museum; one in the Genoa Museum; one in the Turin Museum; and one in the collection of Baron de Selys-Longchamps.

Sir Edward Newton likewise knew of two specimens in the Museum at Port Louis in Mauritius, and there is also the skeleton in Prof. Newton's possession; so that, with the one recently added to the British Museum, there are probably sixteen specimens in existence. The Italian Museums received their specimens from the same source, viz. from Prof. Savi at Pisa; and some of those in other Museums are from the same source. Count Salvadori has published a very interesting article on the *Fregilupus*, in which he informs us that Savi received several specimens from a Corsican priest named Lombardi, and that these specimens were given away by Savi in the most generous spirit, as he appears to have retained only a single specimen for the Pisa Museum.

Like other insular forms, the *Fregilupus* seems to have courted extermination by its very tameness and ignorance of danger. The late Mr. Pollen stated in 1868 that the species had become so rare in Réunion that when he visited the island not one had been heard of for ten years, though it was still believed to survive in the forests of the interior. The old people who remembered when the birds were still common told him that they were so stupid and fearless that they could easily be knocked down with sticks.

The extinct *Necropsar rodericanus*, Slater, was the representative of *Fregilupus* in Rodriguez (cf. Günther and E. Newton, Phil. Trans., vol. clxviii. p. 427), and its nearest living ally of the *Fregilupus* is probably *Falculia* of Madagascar, but there is also considerable affinity to *Basileornis* of Celebes and Ceram. An excellent account of the osteology of the genus was given by Dr. Murie in the Proceedings of the Zoological Society for 1873.

R. BOWDLER SHARPE.

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## *A MANSION HOUSE MEETING IN AID OF THE PASTEUR INSTITUTE.*

THE Lord Mayor has fixed July 1, at 3 p.m., at the Mansion House, for a public meeting to hear the statements of scientific and medical men with regard to the prevention and cure of hydrophobia. Sir James Paget has promised to address the meeting, and it is expected that Sir Henry Roscoe, Dr. Lauder Brunton, Sir Joseph Lister, Prof. Ray Lankester, Sir Joseph Fayrer, Mr. Victor Horsley, Mr. Everett Millais, and others will take part in the proceedings. All scientific men interested in M. Pasteur's discoveries are earnestly requested to

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